

REMARKS

Claims 1-20, 22, and 23 are all the claims presently pending in the application.

While Applicant believes that all of the claims are patentable over the prior art of record, to expedite prosecution, independent claims 1 and 15 are amended to incorporate the features of claim 21, which is believed to be clearly patentable over the prior art of record. Claim 21 correspondingly is canceled without prejudice or disclaimer.

Claims 13 and 16-19 are amended merely to make editorial changes. Claim 22 is amended merely to change its dependency from claim 21 to independent claim 1.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicants specifically state that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Claims 1, 2, 3, 13, 14, and 18-22 are rejected under 35 U.S.C. § 102(e) as being anticipated by Zhang et al. (US 6,354,630).

Claims 4 and 5 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Zhang in view of Gasper et al. (US 5,919,730).

Claim 8 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Zhang in view of Bouldin et al. (US 4,837,134) and further in view of Dickerson et al. (US 5,633,126).

Claims 6 and 7 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Zhang in view of Yano et al. (US 6,035,308).

Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang, in view of Cass, et al. (US 5,946,414).

Claim 12 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Zhang in view of Cass and further in view of Hayashi et al (US 2003/0161496 A1).

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Boswell (US 5,559,933) in view on Zhang.

Claim 23 is rejected under U.S.C. § 103(a) as being unpatentable over Zhang in view of Bouldin further in view of Dickerson.

These rejections are respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

The present invention relates to an invisible information recording method for recording an image being different from a visually perceived image on a part of a sheet of a paper on which an image is recorded, and an image forming apparatus using the same. Further, the invention relates to a printing system which easily retrieves the already printed document data from a part of a printed document formed by the image forming apparatus.

In related art methods and systems for embedding information, a diameter of each dot is typically 0.1 mm. However, a dot of this size is visible, which is not desirable. On the other hand, in the related art methods and systems, when invisible, isolated micro dots are embedded into the image, the recording reliability is deteriorated.

Thus, the related art methods and systems have problems in that, as the result of embedding the additional information, the image quality is deteriorated, it is difficult to read out the embedded information, and/or, when micro dots that cannot be perceived are

printed, the reliability is unsatisfactory (e.g., see specification at page 3, lines 13-25, and page 4, line 1; see also page 4, lines 15-21).

The claimed invention, on the other hand, provides an image forming method and apparatus which is capable of embedding a large amount of additional information in an image in an invisible fashion and without deteriorating the image quality (e.g., see specification at page 5, lines 21-24).

According to the novel and unobvious exemplary aspects of the present invention, large amount of information different from an image visually perceived can be embedded so as to be invisible to the naked eye by utilizing blank areas on a recording sheet of paper. In other words, a lot of additional information can be embedded into a visible image by assigning information items, e.g., characters and symbols, to a plurality of patterns each consisting of dots invisible to the naked eye, which are distributed to such an extent that a variation of densities of the distributed dots cannot be visually perceived by the naked eye (e.g., see specification at page 6, lines 8-17).

For example, in the exemplary aspect of the invention illustrated in Figure 5, a blank area extraction part 32 extracts a blank area or blank areas from the print page image. Ideally, it extracts a plurality of rectangular blanks from the page image. The information 33 is prepared, which is different from the image to be printed, i.e., the image visually perceived. The information may contain detailed attributes of the printed page, file storing locations, author of the document, page correction history, and others. The information 33 different from the perceived image is converted into an invisible pattern as exemplarily shown in Figure 2, by the invisible pattern conversion part 34. The converted invisible pattern is combined with the blank areas extracted by the blank area

extraction part 32, and the resultant data is output to the printer 36 (e.g., see specification at page 15, lines 3-15).

II. THE CITED REFERENCES

A. Zhang

Zhang relates to a method for encoding, on an imprintable medium, identification information for identifying the imprintable medium in a manner detectable by a print-monitoring system includes the steps of defining an identification pattern. The identification pattern is imprinted on a print control region so as to be relatively inconspicuous to an unaided human reviewer of the printed matter while remaining detectable to a print monitoring system. The method includes the step of imprinting, at a plurality of locations in the print control region, a plurality of bit characters detectable by the print control system. The spatial distribution of the bit characters encodes information about the identity of the document.

B. Gasper, et al.

Gasper relates to media for restricting copying of a document utilizing one or more microdots that are embedded in the document for providing a non-visual, but machine detectable mark or marks. The detected means for detecting the presence of one or more microdots in the document inhibits a copy machine from copying the document (e.g., see Gasper at Abstract).

C. Bouldin

Bouldin relates to a data card for optical information featuring a gelatin layer having a thin black crust at the top of the layer. The crust is formed by developed black irregular oblong silver particles within the top 0.5 micron of the gelatin colloid matrix.

The remainder of the colloid matrix is substantially clear gelatin and a reflective metallic layer is disposed below the gelatin. The strip is laminated into a wallet-size card and may be pre-patterned during formation of the crust with control indicia or pre-recorded data. User data may be recorded by modifying the black silver particles in the crust with a laser to expose the reflective underlayer. A laser or other light source is used to read data on the medium with optical contrast between the black surface metallic layer underlying the gelatin layer which can be observed in the recorded spots.

D. Dickerson

Dickerson relates to a radiation-sensitive silver halide film for reproducing digitally stored medical diagnostic images through a series of laterally offset exposures by a controlled radiation source followed by processing in 90 seconds or less, including development, fixing and drying. The film exhibits an average contrast in the range of from 1.5 to 2.0, measured over a density above fog of from 0.25 to 2.0. An emulsion layer is provided in which silver bromochloride grains (a) comprised of at least 10 mole percent bromide, based on silver, (b) having a mean equivalent circular diameter of less than 0.40 μm , (c) exhibiting an average aspect ratio of less than 1.3, and (d) coated at a silver coverage of less than 40 mg/dm^2 . Adsorbed to the surfaces of the silver bromochloride grains at least one spectral sensitizing dye having an absorption half peak bandwidth in the spectral region of exposure by the controlled exposure source. The film contains an infrared opacifying dye that is capable of reducing specular transmission through the film before, during and after processing to less than 50 percent, measured at a wavelength within the spectral region of from 850 to 1100 nm. The film contains a magnetic recording layer which provides a positive b^* value influence that is more than offset by the negative b^* value influence of the silver bromochloride emulsion, allowing

magnetic recording layer integration into the film while achieving favorable image tone and minimum density characteristics.

E. Yano, et al.

Yano relates to a document data administrating system including a filing means for previously storing data related to particular words, texts, symbols, or graphics as related data files. The system includes medium paper including at least one piece of description data, linking data, and selection data. The system further includes a reading means for reading out selection data and linking data from the medium data, a searching means for searching corresponding related data files from the filing means according to the selection data and linking data each read out by the reading means, and an outputting means for outputting the related data files each searched by the searching means (e.g., see Yano at Abstract).

Yano discloses recording data in code areas (linking data, related data, and other data) with invisible ink or toner each readable in invisible rays such as ultraviolet rays and infrared rays. Yano asserts that visibility (readability) of data as a document for Inper (e.g., Interact paper, medium paper, etc.), can further be improved. Also, Yano asserts that the Inper can be handled on its appearance in the same manner as an ordinary document can be, and disposable Inpers can also be used for memos or the like, which allegedly makes it possible to effectively utilize paper resources (e.g., see Yano at column 33, lines 53-67).

F. Cass, et al.

Cass relates to message values included in a set of valid message values that constitute a coding scheme and which each encoded in an image region, called an

encoded signal block, composed of a spatially arranged pattern of colored sub-regions (e.g., see Cass at Abstract; see also column 6, lines 42-46).

Cass discloses that the colored sub-regions have color values produced by modulating a reference color value by a color change quantity expressed as a color space direction in a multi-dimensional color space such that the average color of all of the sub-region colors is the reference color. There is a unique pattern of color-modulated sub-regions for each valid message value in the coding scheme.

In one embodiment, the color space direction is computed to be simultaneously detectable by a digital image capture device such as a scanner and substantially imperceptible to a human viewer, so that the embedded data represented by the pattern of color modulations are visually imperceptible in the encoded signal block.

When the reference color is determined to be the average color of an image region in an original color image, the encoded signal block may replace the image region in the original image, producing an encoded image version of the original image having little or no image degradation. The original image colors become carriers of the encoded data. Signal blocks may be arranged to encode data in only one dimension in an image, which allows for less complex decoding algorithms, or in a two dimensional array or grid-like structure, which allows for a high encoded data density rate.

Cass discloses that its image encoding technique is motivated by the need to reliably encode information at a high density rate in an image, and in particular in graphic or photographic images, without any perceived image degradation or distortion (e.g., see column 6, lines 42-46).

G. Hayashi, et al.

Hayashi relates to a technique for embedding digital-watermark information in image data while minimizing deterioration of the original image quality. Hayashi discloses a data processing apparatus having input means for inputting image data consisting of a plurality of coefficients, and embedding means for embedding digital-watermark information in coefficients having values falling within a predetermined range of the input image data (e.g., see Hayashi at Abstract).

H. Boswell

Boswell relates to a system and method for transferring and printing files originating on mainframe computer systems, workstations, or personal computers connected within a heterogeneous computer network is disclosed. The printer controller coordinates the distribution of print files across multiple computer systems to attached printers for printing.

In response to incoming files received from another computer system within the network, Boswell's system utilizes file mask attributes to automatically generate transfer requests and print requests. In response to user inputs through a graphical user interface, Boswell's system updates various file databases, print attribute and transfer attribute libraries, and system configurations before generating a transfer or print request. Support for multiple page description languages and multiple printers is provided (e.g., see Boswell as Abstract).

III. THE PRIOR ART REJECTIONS

A. Claims 1, 2, 3, 13, 14, and 18-22:

Claims 1, 2, 3, 13, 14, and 18-22 are rejected under 35 U.S.C. § 102(e) as being anticipated by Zhang.

The Examiner has withdrawn the previous rejections of independent claim 1 under 35 U.S.C. § 103 based on Zhang and Gasper. However, in the present non-final Office Action, the Examiner now rejects independent claim 1 under 35 U.S.C. § 102 as being anticipated by Zhang.

The Examiner alleges that Zhang discloses all of the features of claims 1, 2, 3, 13, 14, and 18-22. However, applicant respectfully disagrees with the Examiner position, and therefore, traverses this rejection.

As mentioned above, while Applicant believes that all of the claims are patentable over the prior art of record, to expedite prosecution, independent claim 1 is amended to incorporate the features of claim 21, to define more clearly that the claimed invention extracts a plurality of locations of blank areas from the page image of the sheet of paper, which is believed to be clearly patentable over the prior art of record. Claim 21 correspondingly is canceled without prejudice or disclaimer.

In the present Office Action, the Examiner continues to assert that Zhang discloses a method of extracting a plurality of rectangular blank areas from the page image. The Examiner relies on column 4, lines 53-60 of Zhang for allegedly disclosing a plurality of print control symbols.

Specifically, column 4, lines 53-60 of Zhang discloses that:

In preferred embodiments, the printer prints the print control symbol at predetermined positions on the printed matter. These positions are spatially separated from the informational content of the printed matter. The print control symbol itself is configured to be relatively

inconspicuous to an unaided human reviewer. Preferably the print control symbol is invisible to the overwhelming majority of unaided human reviewers (emphasis added).

The Examiner alleges that the use of the word “the” in “the print control symbol” teaches one block of information. The Examiner also alleges that “at predetermined positions” teaches at a plurality of locations. However, Applicant respectfully disagrees with the Examiner’s interpretation for several reasons.

Independent claim 1

First, Applicant submits that nowhere does Zhang disclose or suggest that there is more than one print control symbol used for each printed matter. That is, considered as a whole, Zhang teaches using a single print control symbol for each printed matter (i.e., each sheet of paper or each document).

The Examiner relies solely on the above paragraph for the alleged teaching of a plurality of print control symbols in a single sheet of paper of printed matter. However, the Examiner’s interpretation does not correspond to the context of the teachings of Zhang.

That is, contrary to the Examiner’s interpretation, it appears that the relied upon portion of Zhang is referring to printing a single print control symbol on each of a plurality of printed matter (i.e., a plurality of sheets of paper or documents), not a plurality of print control symbols on a single sheet of paper.

Indeed, when considered as a whole, Zhang repeatedly discloses printing a single print control symbol on each of a plurality of printed matter to sequence the plurality of sheets of paper of such printed matter. In other words, each sheet of paper of the print matter has a single print control symbol which is decoded and used to sequence each

printed matter with the rest of the plurality of printed matters (e.g., see Zhang at column 4, lines 64-67, and column 5, lines 1-2).

Moreover, Zhang clearly discloses, with reference to Figure 6, a plurality of printers 348A-348C, each of which generates a stream of printed matter 10A-10C (i.e., a stream of printed sheets of paper). Zhang discloses that each of the streams of printed matter 10A-10C are imprinted with a single print control symbol 214 which encodes sequencing information that correlates each of the streams of printed matter 10A-10C from each of the separate printers, 348A-348C (see Zhang at column 15, lines 40-67, and column 16, lines 1-3). Thus, each of the plurality of printed sheets of paper would have a single print control symbol, not a plurality of print control symbols on each sheet of paper.

In fact, nowhere does Zhang even disclose detecting more than a single print control symbol on a single sheet of paper. Instead, Zhang teaches that the spacing from the printed images to the single print control symbol is designed to facilitate easily locating that single print control symbol without confusing it with other printed informational content (e.g., see Zhang at column 6, lines 1-9). Again, Zhang does not mention detecting more than one print control symbol.

Thus, Applicant respectfully submits that it would not make sense (i.e., it would not be reasonable) to interpret the relied upon paragraph of Zhang in a manner that is contrary to the context of the surrounding teachings of Zhang.

For the foregoing reasons, Applicant respectfully submits that the Examiner's interpretation of column 4, lines 53-60, and the Examiner's reliance thereon as the sole support for the teaching of a plurality of print control symbols on a single printed matter, clearly are unreasonable and do not comport with the actual teachings of Zhang.

In comparison, the claimed invention clearly defines an invisible information recording method in which a plurality of locations of blank areas are extracted from the page image of the sheet of paper, as recited, for example, in claim 1. The claimed invention records a digital image on said plurality of blank areas on said sheet of paper.

Thus, Zhang clearly does not disclose or suggest all of the features of independent claim 1.

Moreover, dependent claims 2, 3, 13, 14, 18-20, and 22 also are patentable over Zhang by virtue of their dependency from independent claim 1, as well as for the additional combination of features recited therein, for somewhat similar reasons as those set forth below with respect to independent claim 1.

For example, claim 22 recites that “*recording the digital image comprises recording a copy of at least a portion of said information into at least one other location of said plurality of locations of said blank areas*” (emphasis added).

Even assuming *arguendo* that Zhang discloses recording a plurality of print control symbols into a single printed matter (i.e., a single sheet of paper of a document), Applicant respectfully notes that the Examiner has not shown *how* or *where* Zhang explicitly discloses that such is or must be a copy of the information in another location.

Absent an explicit or inherent disclosure, the Examiner’s rejection under 35 U.S.C. § 102 should be withdrawn, since an anticipation rejection clearly would not be appropriate.

In comparison, claim 22 recites that “*recording the digital image comprises recording a copy of at least a portion of said information into at least one other location of said plurality of locations of said blank areas*” (emphasis added).

The specification clearly explains the important advantage of the claimed invention in that where the information is embedded into a plurality of locations, if some of the information is missing or printed incorrectly, the information embedded in the remaining locations can be used to compensate for the missed information by superimposing the extracted patterns (e.g., see specification at page 15, last paragraph, and pages 15-16, bridging paragraph).

For at least the foregoing reasons, Applicant submits that Zhang clearly does not disclose or suggest all of the features of claim 22.

Thus, Zhang clearly does not disclose or suggest all of the features of claims 1, 2, 3, 13, 14, and 18-22, and therefore, the Examiner is requested to reconsider and withdraw this rejection.

B. Claims 4 and 5:

Claims 4 and 5 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Zhang in view of Gasper et al. (US 5,919,730).

The Examiner alleges that the combination of Zhang and Gasper discloses or suggests all of the features of the claimed invention.

For the reasons set forth above, Applicant submits that claims 4 and 5 are patentable over Zhang and Gasper, either individually or in combination, at least by virtue of their dependency from claim 1.

Moreover, Applicant respectfully submits that, even assuming *arguendo* that Zhang and Gasper could be combined to arrive at the claimed invention, the ordinarily skilled artisan would not have been motivated (i.e., it would not have been obvious) to combine Zhang and Gasper to arrive at the claimed invention since Gasper teaches away

from Zhang. Indeed, in view of such contrary teachings, Applicant submits that it would not have been obvious to modify Zhang and Gasper, absent the benefit of Applicant's own teachings (i.e., impermissible hindsight based analysis). Thus, Applicant respectfully submits that it would not have been obvious to combine Zhang and Gasper, and therefore, traverses this rejection.

Zhang

For example, Zhang discloses printed matter 200 which includes a page 212 on which printed informational content 210 is printed (see Figure 1; see also Zhang at column 5, lines 51-67, and column 6, lines 1-19). Zhang discloses that the printed information content 210 can be text or an image located on the page 212.

Zhang discloses that the printed matter 200 further includes a print control symbol 214 made up of a plurality of bit characters 216. That is, Zhang discloses only one print control symbol 214.

Zhang discloses that the print control symbol 214 is preferably located at a predetermined position (i.e., only one position) on the page 212 (e.g., the upper left hand corner of the page 212). Zhang discloses that, although it is not imperative that the print control symbol 214 be at a predetermined location, it is preferable that this be the case since a print control symbol 214 at a pre-determined location can then be found more quickly.

Thus, Zhang merely discloses that the printed matter 200 further includes a print control symbol 214 made up of a plurality of bit characters 216. That is, Zhang discloses only one print control symbol 214, not a plurality of print control symbols. Further, Zhang discloses that the print control symbol 214 is preferably located at a predetermined

position (i.e., only one position) on the page 212 (e.g., the upper left hand corner of the page 212), not a plurality of locations.

Moreover, as mentioned above, Zhang discloses printing a single print control symbol on each of a plurality of printed matter (i.e., a plurality of sheets of paper or documents), not a plurality of print control symbols on a single sheet of paper.

Indeed, when considered as a whole, Zhang repeatedly discloses printing a single print control symbol on each of a plurality of printed matter to sequence the plurality of sheets of paper of such printed matter. In other words, each sheet of paper of the print matter has a single print control symbol which is decoded and used to sequence each printed matter with the rest of the plurality of printed matters (e.g., see Zhang at column 4, lines 64-67, and column 5, lines 1-2).

Moreover, Zhang clearly discloses, with reference to Figure 6, a plurality of printers 348A-348C, each of which generates a stream of printed matter 10A-10C (i.e., a stream of printed sheets of paper). Zhang discloses that each of the streams of printed matter 10A-10C are imprinted with a single print control symbol 214 which encodes sequencing information that correlates each of the streams of printed matter 10A-10C from each of the separate printers, 348A-348C (see Zhang at column 15, lines 40-67, and column 16, lines 1-3). Thus, each of the plurality of printed sheets of paper would have a single print control symbol, not a plurality of print control symbols on each sheet of paper.

In fact, Zhang does not disclose or suggest detecting more than a single print control symbol on a single sheet of paper. Instead, Zhang teaches that the spacing from the printed images to the single print control symbol is designed to facilitate easily locating that single print control symbol without confusing it with other printed

informational content (e.g., see Zhang at column 6, lines 1-9). Again, Zhang does not mention detecting more than one print control symbol.

Gasper

On the other hand, Gasper relates to media for restricting copying of a document utilizing one or more microdots that are embedded in the document for providing a non-visual, but machine detectable mark or marks. The detected means for detecting the presence of one or more microdots in the document inhibits a copy machine from copying the document (e.g., see Gasper at Abstract).

Gasper discloses that, in the preferred embodiment of the invention, the microdot pattern is incorporated throughout the document to be copy restricted. Gasper further discloses that microdot placement at all locations within the document insures that the pattern will exist in at least one important area of the document making it impossible to remove the pattern by physical cropping without significantly decreasing the usefulness of any copied document (e.g., see Gasper at column 6, lines 5-14). Gasper also discloses that the microdot pattern can be incorporated into the photographic medium prior to production of the photographic image (e.g., see Gasper at column 9, lines 38-46). That is, all of the medium would be printed with the microdot pattern.

On the other hand, Gasper also discloses that, in another preferred form of the invention, the microdot pattern is incorporated into the document in a pre-selected location or locations not covering the entire document (e.g., see Gasper at column 6, lines 5-14). Gasper does not, however, specifically disclose or suggest that the microdot pattern is recorded on a location of at least one blank area.

Applicant respectfully submits that, even assuming *arguendo* that Zhang and Gasper could be combined to arrive at the claimed invention, the ordinarily skilled artisan

would not have been motivated (i.e., it would not have been obvious) to combine Zhang and Gasper to arrive at the claimed invention, since Gasper teaches away from Zhang.

Indeed, in view of such contrary teachings, Applicant submits that it would not have been obvious to modify Zhang and Gasper, absent the benefit of Applicant's own teachings (i.e., impermissible hindsight based analysis).

For example, as mentioned above, Zhang discloses one print control symbol 214 located at a predetermined position (i.e., only one position) on the page 212 (e.g., the upper left hand corner of the page 212). Zhang discloses that, although it is not imperative that the print control symbol 214 be at a predetermined location, it is preferable that this be the case since a print control symbol 214 at a pre-determined location can then be found more quickly.

On the other hand, Gasper discloses a microdot pattern that is incorporated throughout the document to be copy restricted. Gasper further discloses that microdot placement at all locations within the document insures that the pattern will exist in at least one important area of the document making it impossible to remove the pattern by physical cropping without significantly decreasing the usefulness of any copied document (e.g., see Gasper at column 6, lines 5-14). Gasper also discloses that the microdot pattern can be incorporated into the photographic medium prior to production of the photographic image (e.g., see Gasper at column 9, lines 38-46). That is, all of the medium would be printed with the microdot pattern.

Thus, Applicant submits that it would not have been obvious to modify Zhang and Gasper, since Gasper teaches away from Zhang.

In other words, Zhang discloses one predetermined location for a single print control symbol 214 so that the print control symbol 214 can be found more quickly.

In contrast to Zhang, Gasper discloses placing a microdot pattern at all locations within the document to insure that the pattern will exist in at least one important area of the document making it impossible to remove the pattern by physical cropping without significantly decreasing the usefulness of any copied document.

Thus, Gasper's method of placing the microdot pattern at all locations within the document to insure that the pattern will exist in at least one important area of the document making it impossible to remove the pattern by physical cropping without significantly decreasing the usefulness of any copied document is contrary to the teachings of providing a single print control symbol 214 which can be found more quickly, as disclosed by Zhang.

Thus, even assuming *arguendo* that Zhang and Gasper *could* be combined to arrive at the claimed invention, the ordinarily skilled artisan would not have been motivated (i.e., it would not have been obvious) to combine Zhang and Gasper to arrive at the claimed invention, since Gasper teaches away from Zhang.

Indeed, in view of such contrary teachings, Applicant submits that it would not have been obvious to modify Zhang and Gasper, absent the benefit of Applicant's own teachings (i.e., impermissible hindsight based analysis).

For the foregoing reasons, Applicant submits it would not have been obvious to combine Zhang and Gasper to arrive at the claimed invention. Thus, Applicant submits that dependent claims 4 and 5 are patentable over Zhang and Gasper, either individually or in combination.

C. Claim 8:

Claim 8 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Zhang in view of Bouldin et al. (US 4,837,134) and further in view of Dickerson et al. (US 5,633,126).

Applicant submits that claim 8 is patentable over the cited combination of references at least by virtue of its dependency from claim 1, as set forth above.

D. Claims 6 and 7:

Claims 6 and 7 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Zhang in view of Yano et al. (US 6,035,308).

Applicant submits that claims 6 and 7 are patentable over the cited combination of references at least by virtue of their dependency from claim 1, as set forth above.

E. Claims 9-11:

Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang in view of Cass et al. (US 5,946,414).

Applicant submits that claims 9-11 are patentable over the cited combination of references at least by virtue of their dependency from claim 1, as set forth above.

F. Claim 12:

Claim 12 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Zhang in view of Cass and further in view of Hayashi et al (US 2003/0161496 A1).

Applicant submits that claim 12 is patentable over the cited combination of references at least by virtue of its dependency from claim 1, as set forth above.

G. Independent Claim 15:

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Boswell (US 5,559,933) in view on Zhang.

Applicant submits that independent claim 15 is patentable over Boswell and Zhang, either individually or in combination, for somewhat similar reasons as independent claim 1, as set forth above.

H. Independent Claim 23:

Claim 23 is rejected under U.S.C. § 103(a) as being unpatentable over Zhang in view of Bouldin, and further in view of Dickerson. However, Applicant traverses this rejection for the following reasons.

Independent claim 23 recites, *inter alia*, that “*said recording the digital image comprises recording a copy of at least a portion of said information into at least one other location of said plurality of locations of said blank areas*” (emphasis added).

Similar to the above, the Examiner relies on Zhang at column 4, lines 53-60 for this teaching. However, Applicant respectfully submits that the Examiner has mischaracterized the actual teachings of Zhang, as set forth above with respect to independent claim 1.

That is, the Examiner continues to assert that Zhang discloses a method of extracting a plurality of rectangular blank areas from the page image. The Examiner relies on column 4, lines 53-60 of Zhang for allegedly disclosing a plurality of print control symbols.

Specifically, column 4, lines 53-60 of Zhang discloses that:

In preferred embodiments, the printer prints the print control symbol at predetermined positions on the printed matter. These positions are spatially separated from the informational content of the printed matter. The print control symbol itself is configured to be relatively inconspicuous to an unaided human reviewer. Preferably the print control symbol is invisible to the overwhelming majority of unaided human reviewers (emphasis added).

The Examiner alleges that the use of the word “the” in “the print control symbol” teaches one block of information. The Examiner also alleges that “at predetermined positions” teaches at a plurality of locations.

However, Applicant respectfully submits that Zhang does not disclose or suggest that there is more than one print control symbol used for each printed matter. On the contrary, when considered as a whole, Zhang teaches using a single print control symbol for each printed matter (i.e., each sheet of paper or each document).

Indeed, the relied upon portion of Zhang is referring to printing a single print control symbol on each of a plurality of printed matter (i.e., a plurality of sheets of paper or documents), not a plurality of print control symbols on a single sheet of paper. Thus, when considered as a whole, Zhang repeatedly discloses printing a single print control symbol on each of a plurality of printed matter to sequence the plurality of sheets of paper of such printed matter. In other words, each sheet of paper of the print matter has a single print control symbol which is decoded and used to sequence each printed matter with the rest of the plurality of printed matters (e.g., see Zhang at column 4, lines 64-67, and column 5, lines 1-2).

Moreover, Zhang clearly discloses, with reference to Figure 6, a plurality of printers 348A-348C, each of which generates a stream of printed matter 10A-10C (i.e., a stream of printed sheets of paper). Zhang discloses that each of the streams of printed

matter 10A-10C are imprinted with a single print control symbol 214 which encodes sequencing information that correlates each of the streams of printed matter 10A-10C from each of the separate printers, 348A-348C (see Zhang at column 15, lines 40-67, and column 16, lines 1-3). Thus, each of the plurality of printed sheets of paper would have a single print control symbol, not a plurality of print control symbols on each sheet of paper.

In fact, nowhere does Zhang even disclose detecting more than a single print control symbol on a single sheet of paper. Instead, Zhang teaches that the spacing from the printed images to the single print control symbol is designed to facilitate easily locating that single print control symbol without confusing it with other printed informational content (e.g., see Zhang at column 6, lines 1-9). Again, Zhang does not mention detecting more than one print control symbol.

Thus, Applicant respectfully submits that it would not make sense (i.e., it would not be reasonable) to interpret the relied upon paragraph of Zhang in a manner that is contrary to the context of the surrounding teachings of Zhang.

For the foregoing reasons, Applicant respectfully submits that the Examiner's interpretation of column 4, lines 53-60, and the Examiner's reliance thereon as the sole support for the teaching of a plurality of print control symbols on a single printed matter, clearly are unreasonable and do not comport with the actual teachings of Zhang.

In comparison, the claimed invention clearly defines an invisible information recording method in which a plurality of locations of blank areas are extracted from the page image of the sheet of paper, as recited, for example, in claim 23. The claimed invention records a digital image on said plurality of blank areas on said sheet of paper.

Thus, Zhang clearly does not disclose or suggest the features of independent claim 23 for which it is being relied upon.

Moreover, even assuming *arguendo* that Zhang discloses recording a plurality of pint control symbols into a single printed matter (i.e., a single sheet of paper of a document), Applicant respectfully notes that the Examiner has not shown *how* or *where* Zhang explicitly discloses that such is or must be a copy of the information in another location.

For example, independent claim 23 further recites, *inter alia*, that “*said recording the digital image comprises recording a copy of at least a portion of said information into at least one other location of said plurality of locations of said blank areas*” (emphasis added).

The specification clearly explains the important advantage of the claimed invention in that where the information is embedded into a plurality of locations, if some of the information is missing or printed incorrectly, the information embedded in the remaining locations can be used to compensate for the missed information by superimposing the extracted patterns (e.g., see specification at page 15, last paragraph, and pages 15-16, bridging paragraph).

For at least the foregoing reasons, Applicant traverses the rejection of independent claim 23, since Zhang clearly does not disclose or suggest all of the features of independent claim 23, for which it is relied upon.

Moreover, Applicant submits that Bouldin and Dickerson do not make up for the deficiencies of Zhang, with respect to independent claim 23, and indeed, are not relied upon for such teachings.

For at least the foregoing reasons, Applicant submits that Zhang, Bouldin, and Dickerson, either individually or in combination, do not disclose or suggest all of the features of independent claim 23. Therefore, the Examiner is requested to reconsider and withdraw this rejection.

IV. CONCLUSION

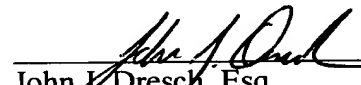
In view of the foregoing, Applicants submit that claims 1-20, 22, and 23, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

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